

yellow, this species can be easily distinguished from the foregoing one.

Dr. Cantor refers to a different species, found in 1836 by Mr. Griffiths under stones in the Naga Hills, and to another observed in Bengal (*vide* Ann. and Mag. Nat. Hist. 1842, vol. ix. p. 277).

The woodcut, p. 55, is from a coloured drawing by Dr. Cantor in the Collection of the British Museum. The original specimen is also in the same collection.

3. *D. Cantoria*, n. sp.

This species, named after Dr. Cantor, who appears to have been the first to draw attention to this curious form, is the largest of the three species at present known. It was discovered by Mr. Fortune, the well-known Chinese traveller.

In length it is more than double that of either *D. Grayia* or *D. ferudpoorensis*; and the expanded hammer-head-like portion is exceedingly well marked.

There is something highly characteristic in the manner in which the peculiar longitudinal band (which seems to be of a different structure from the rest of the body) terminates towards the hammer-headed extremity: in *D. ferudpoorensis* it ends without expanding laterally; in *D. Grayia* it expands as shown in the previous figure; while in *D. Cantoria* it terminates in the manner here represented.



There appears to be no trace of this genus in the fine collection of annulose animals at the Jardin des Plantes, Paris. Full details, with carefully drawn-up specific descriptions, will shortly be forwarded to the Linnæan Society; in the mean time this brief notice may cause some attention to be paid to these little animals, which doubtless are common on the continent of Asia; and the author would be happy to receive specimens, so that he may be enabled to complete his account of the group. He is led to believe that, in addition to the localities given above, they occur likewise in the neighbourhood of Kandy (Ceylon) and near Calcutta.

BIBLIOGRAPHICAL NOTICE.

Cybele Britannica; or, British Plants and their Geographical Relations. By HEWETT COTTRELL WATSON. Vol. IV. Longman & Co. 1859.

THE fourth volume of the 'Cybele Britannica' fitly concludes a work whose value is already widely acknowledged, and will be yet more evident when other branches of our fauna and flora shall have been

brought into comparison with the Flowering Plants. Then may be offered a sounder basis for explaining some of the phænomena of geographical distribution, which in our times are so full of promise, but whose existence has hitherto rather been made evident than satisfactorily accounted for.

The 'Cybele Britannica' is an "*opus per se*," as it is a model for future operations. We English botanists may well claim that our Flowering Plants have been better and more systematically explored than those of any other country. It is true that M. Lecoq has given, in ten royal octavo volumes, an account of the features of the flora of a portion of France, including an outline of the general "area" of each species; but we do not fear a comparison between his book and the English 'Cybele.' To say nothing of its lengthy disquisitions, and too often fanciful theories, there is, in the French work, great want of convenient tabular summaries. The plants of his own district are not nearly so thoroughly investigated by M. Lecoq, in his 'Études;' besides, the very size and expense of the volumes places them beyond the reach of most readers. Indeed, we do not feel at all sure that the comparison with Mr. Watson's work is fair to either writer, since M. Lecoq avowedly addresses himself chiefly to the general question, while Mr. Watson equally professes to give his attention rather to local and particular details.

When treating of his species, M. Lecoq first discusses the aspect and distribution of the order, then the statistics, range, &c., of the genus—very interesting points, it is true, but somewhat out of place in a local treatise. Then follows a kind of biography of each plant, extending often over two pages, separate paragraphs being besides devoted to—1. nature of soil; 2. altitude (often only approximately given); 3. a statement of the entire or general range. Here the very want of that precision which is so valuable a feature of the 'Cybele' is, in our eyes, the fault of the French author.

But we cannot help regretting that no place has been allotted by Mr. Watson for a few words respecting the *kind of soil** most favourable to each species—whether silicious, calcareous, argillaceous or peaty, friable or compact; for this is a point always of high interest to the local observer, and one to which M. Jules Thurmann has recently devoted two volumes; Mr. J. G. Baker, too, has given a convenient abstract, in the shape of a pamphlet, where the English plants are arranged somewhat after the manner of M. Thurmann. We must, however, confess that we feel some misgiving as to the adoption of so difficult a terminology as that of the Swiss author. If the harsh terms of "Dysgeogenous" and "Eugeogenous" be fairly represented by "compact" and "friable," we might hope to find

* Something, indeed, is to be gathered from the terms "glareal," "ericetal," "rupestral," &c.; and, in most cases, mention is made of the attachment of a species to a calcareous substratum, which often greatly influences the assigning of plants to the "Germanic" or South-eastern group, because it is on the east side of England that the Chalk principally occurs. But the desideratum above mentioned consists in the absence of a line regularly devoted to a statement of the soil preferred by each species.

the English names adopted where the terrible Greek compounds would discourage any but an experienced classic. At the same time, however true in the main or convenient may be M. Thurmann's method of classifying soils according to their relative friability, his subdivisions seem to us rather consequences of the chemical nature of the soil than to be themselves of the first importance. From what is known of the inorganic constituents of plants, it is surely the chemical ingredients which determine the presence or absence, rarity or frequency of certain species, quite as much as the so-called "mechanical" conditions.

Mr. Watson has devoted a useful life and much conscientious labour to his favourite branch of botany. Many of our readers will remember the "Outlines of" and "Remarks upon" the "Geographical Distribution of British Plants,"—short sketches that gave high promise for the future, which promise is now amply fulfilled. These two preliminary volumes were presently followed (in 1843) by a more elaborate treatise, somewhat on the scale of M. Lecoq's. This third edition having proved too bulky, Mr. Watson, wisely foreseeing the hopeless length to which that work would have extended, proceeded (in 1847) to try a shorter plan in the four volumes by which his name has now become so generally known,—the 'Cybele Britannica.'

Of our author's fitness for his self-imposed task there can be no question: we are fortunate in meeting with a writer who, united to a rare judgment in weighing evidence, has a most happy method (all his own) of condensing particulars. His results are expressed with remarkable terseness; and the caution observed in even suggesting any general views, under the present imperfect *data*, contrasts very favourably with the proceedings of many other writers on the subject, who have been more ready to advance bold theories than to arrange sober facts.

It is not our object to discuss the plan and arrangement adopted by Mr. Watson, further than to say that we believe no smaller space could have done justice to the author's labours, since the remarks that follow the statistics of each species in the three earlier volumes of the 'Cybele Britannica' are so much to the point, and have contributed in no small degree to our present improved knowledge of the plants; still, we believe something might have been gained by giving in each case the names of the botanists whose testimony vouched for the occurrence of the plants in the several "provinces" or districts. Might we venture to suggest to future "Cybelists," with the view of giving due prominence to the certainty or uncertainty of the records, some such plan as the following:—

Suppose two lines to be given to the horizontal distribution of each species, the upper will contain the numerals which represent the "provinces," the second line will show the authorities, *e. g.*—

<i>Vinca</i>	} Prov.	1	2	3	4	5	*	7	*	*
<i>minor</i>		Auth.	Ho.	Br.	Wts.	Bb.	Lg.	0	Dv.	0

By "future Cybelists," we wish it to be understood we mean those

who in other classes of plants, and in the animal kingdom, shall in due time follow in the track so ably marked out by Mr. Watson, and thus at length give us a complete system of the distribution of the existing fauna and flora of Britain. Not that it is desirable to attempt rash generalizations upon the range of any species within Great Britain; but we think an English naturalist will have done his duty, and have done it well, when he has arranged, in a manner so ready for reference, as many valuable details as those given in the 'Cybele Britannica.'

A first step has already been taken towards tracing the range of some of our Insects (Butterflies and *Sphingina*) through the same eighteen districts as the Flowering Plants; and we hope the system of the 'Cybele' will soon become generally adopted by English Faunists. Too much care cannot be exercised in strictly conforming to the rules laid down by Mr. Watson; and, as was said before, the mention of the authorities in each case will be a most desirable addition. It is hardly to be hoped that a similar exactness or fulness of detail is to be obtained at once in the various classes; but if even the horizontal range be carefully traced, it will be a great gain to the philosophic naturalist. We could wish, for instance, that the accomplished author of the 'British Quadrupeds' would, in his second edition, devote two or three pages to a sketch of Mammal distribution, as this would afford an opportunity of comparing more strictly the respective range of the so-called "faunas" and "floras" of Edward Forbes, in part founded upon the "types" of Mr. Watson.

On this subject our author remarks (pp. 8 and 506 of vol. iv.) that, although prepared to admit the possible soundness of Forbes's idea of a difference in age between the alpine and lowland floras, he does not see the necessity of granting that there is any real distinctness between the other "types." The plants are collected into groups only because they present a close resemblance in the *direction of their increase and decrease*; and if this be suggestive of a migration, it by no means equally indicates a difference of age and origin between the groups. It is often so difficult to assign a plant to any one type, that Mr. Watson has been compelled to have recourse to a double system of letters to indicate the species whose distribution is of this intermediate or uncertain character. Moreover, considerable changes have been made, since the appearance of the earlier volumes, by removing species from one "type" to another. Thus the "Atlantic" has 9 added, and 18 removed, chiefly to the "English" type. The proportions and constituents of the "Germanic" are still more altered, no less than 43 species being added, and about 30 taken away. The totals at present remain—127 for the "Germanic" against 69 for the "Atlantic," which thus becomes hardly more than one-half as large as the former, instead of about equal, as estimated in 1847. Mr. Watson also urges that the "types" are, after all, little more than "*climatal arrangements*," determined by actual physical conditions: besides, it is well observed that it is easy to divide into as many groups the flora of any country, yet the geological history of each is utterly different. Such are some of the

arguments advanced by Mr. Watson; and it must be allowed that many of the theories advocated by other writers besides Forbes rest too much upon negative evidence: this is especially true where use has been made of geological data. Perhaps it may be wiser to adopt the course recommended in the 'Cybele,' to postpone for a while our inquiries into the origin and age of species, and to collect hopefully the materials for the future edifice, rather than attempt to rear it upon an insecure foundation.

What we read in this volume of the distribution of the British flora is no bad example of the different groups into which the plants of a country may be subdivided according to individual fancy. Forbes saw five main groups, which he considered distinct in age as well as in character. Henfrey gives four, without touching upon the question of age. Watson has six "types," with a seventh to be added for the West Irish plants; and it also appears that the writer who acknowledges the greatest number of groups is the one who is least inclined to grant a distinctness in age.

Now, leaving out of question the alpine species, the actual features of the British flora are not very different from what might have been expected if the entire lowland vegetation were of uniform age. If we have upon our western shores many of the local and characteristic plants, is not the climate of the west coast quite exceptional as regards Europe? If the so-called "Iberian" plants of the west of Ireland were originally western species, peculiar to the outskirts of their continent, would not the wasting of the land leave just such characters as we now find? As the sea advanced, so would the "maritime" climate, and so would its appropriate plants be gradually driven back upon their outposts, till they found a last refuge upon the mountain slopes and shores of western Europe—more isolated, too, as being most exposed to the inroads of the sea. Of whatever date their origin, the species characteristic of the edge of a continent must naturally be sought at its circumference. Mr. Watson has allotted the species to their several "types" according to their distribution within Great Britain only. Still it may be said, roughly, that we should look among the "Atlantic" (even more, the "Hibernian") rather than the "Germanic," to the western rather than to the eastern side of Britain, for plants that may have once had their "metropolis" in this country. We have thought it necessary to give the more prominence to these considerations because it is so much the fashion to adopt as an axiom the necessity of a different epoch for every different "flora," that few care to incur the charge of being unphilosophical by venturing to question the correctness of this view.

But to return to the volume before us, the fourth of the 'Cybele Britannica.' Its author thus speaks of the nature of his task:—

"So many subjects crowd upon the attention in commencing this fourth volume, that it becomes really difficult to answer the questions, as to which of those subjects are to be treated at any length, which of them can be slightly noticed only, and which of them must be passed over entirely. References to the works of other writers, where

some of his topics are treated in detail, may often greatly assist an author who desires to abbreviate or curtail; but such assistance would here be vainly sought, no works available in this way being in existence. The 'Cybele' must thus cite and arrange its own details, regarded from the geographic points of view. And, indeed, only details can have permanent value at present. Attempts at generalization, so usually made in conformity with the groups of systematic botany, can have extremely little value until those groups are made more settled and uniform." [But will this Utopian uniformity ever come?] "It is to the distribution of species, not of groups, that attention should be given at present, especially in a local treatise. Hence the resort to lists of species in this volume, as condensed summaries of details adapted for comparison and reference." (Introduction, p. 4.)

To extend our survey with equal exactness to the general range of British plants would indeed be a Herculean task, and one from which our author has wisely recoiled. It would require many years and many Watsons to obtain any results that could be fairly compared with those in the volume before us. But, as was said, the work is accomplished in England: let us see the foreign botanists do as much for themselves. Hence we are warned (p. 10) that the scope of the 'Cybele' "must needs be confined to a view of the present vegetation of Britain, and of the manner in which the component species of that vegetation are now distributed within the area of Britain itself, together with such inferences as may be drawn from existing circumstances in regard to the probable origin of those species here: that is, *whether placed in Britain by natural causes, or whether introduced by human agency.*"

The details collected and examined in the three previous volumes are so re-arranged and corrected in the fourth "as to convert the individual and separated facts into collective and comparative expositions." Though dry reading, the arrangement of the species into tabular lists has been chosen as best adapted for reference, and because "thus the greatest amount of special and general facts can be recorded in a condensed form, under different points of view, and can thus be made ready for the use of Phyto-geographers whenever the botany of other countries shall become portrayed in like manner."

Mr. Watson is suspicious of general remarks: he tells us (p. 13) that, unfortunately, the so-called "general remarks" "are in truth" too often "only remarks of the most vague and inexact kind. True generalizations usually require much time and thought, combined with a scrupulous regard to accuracy: true generalizations are in consequence extremely rare."

In Chapter II. are discussed the terms *Orders*, *Genera*, and *Species*, with the inevitable conclusion that the two former have no abstract existence in nature (p. 27), but are conventional ideas only, though of course "bearing more or less accordance with the realities of nature, in so far as they are intended to express and classify the facts of nature, if this is done only by *dissevering a series or chain at those points where the links are widest or least coherent*" (p. 17).

The want of a uniformity of value in the several groups is stated to be the bane of the botanical geographer: Orders are unequal, Genera unequal; Species are unequal too (p. 44). (Here we are tempted to ask, how should we expect mathematical proportions where variety is as much the rule as unity is the law?) But the species are in the worse predicament, that the little we know of their distinctness and limits does not agree with our own definition: our conclusions are only inferences from data and proofs equally incomplete (p. 28). We much fear that human knowledge is doomed to remain imperfect in this particular. Such universal experience, extending over a series of years sufficient for such proof, is probably not within the reach of man. We commend Mr. Watson's definition of a species (p. 31), and his criticism on the subject, to those who wish for a near approach to the desired goal. The illustration given (pp. 48 & 279) of three grades of species is very apt:—

1. *Rubus fruticosus*: a super-species (? supra-Linnæan), or aggregate.
2. *R. saxatilis*: a true species, or integrate.
3. *R. discolor*: a sub-species, or segregate (? infra-Linnæan).
4. *Veronica agrestis*: a dimidiate species, *i. e.* a species halved, by the separation from it of *V. polita*.

The uncertainty (or want of fixedness) in species, as shown by the varying opinions of different authors, and even by the successive editions of the same writer, is sufficiently familiar to all those who have made a serious study of botany; and if the inconsistencies in the practice of authors are very clearly set forth (pp. 40, &c.), it is only one more proof of the fallibility of human judgment, and of the imperfection of our knowledge. May we hope that the rising generation of botanists, whose attention is thus called to a matter of no slight importance, will be found ready to double their efforts to remove this imputation of inconsistency by the only means from which there is no appeal—by a careful series of experiments and diligent cultivation of the plants.

The permanence of species is another question discussed in this chapter; but as this lies at the very root of Mr. Darwin's theory, we need not do more than refer our readers to the many able reviews and discussions which have so recently appeared upon the 'Origin of Species.'

Chapter III. deals with the "introduced species," a subject on which no one can be more at home than Mr. Watson; for to him is due very much of the progress recently made in this country in distinguishing strictly between such plants as are believed to be aboriginal (*i. e.* prehuman natives of the soil) and those which are either suspected or proved to have been imported by human agency.

We cannot help thinking that much yet remains to be done in the way of curtailing the given range of many plants—truly native, may be, in the south of England, but very unjustly reckoned indigenous to the northern counties, Scotland, or Ireland. Nay, there are

doubtless many species, hitherto reckoned native, which a stricter and more philosophical inquiry may perchance reduce even below the rank of "denizens,"—that being the term used by Mr. Watson for cases of uncertainty. We may instance some of the "colonists," and wayside plants, such as *Lepidium Smithii*.

Alphonse DeCandolle is largely quoted, and his views are contrasted with Mr. Watson's own, in a complete list of the species which are distrusted in Britain, with the terms applied to them in the 'Cybele' and the 'Géographie Botanique.' It would appear that the Continental botanist is somewhat more inclined than our author to give any doubtful case in favour of the suspected plant, since, out of the whole 324, the 'Cybele' allows only 30 to be possibly native, whereas the 'Géographie' gives its verdict in favour of 48.

It is to be remembered that Mr. Watson lays more stress upon the right of private judgment, *i. e.* upon the nature of the station where the plant is found growing, than upon geographical considerations. Contrary to DeCandolle, he places actual conditions of growth first, range second and supplementary. The faculty of weighing evidence is one most essential to the botanical geographer (p. 84); but it is well remarked that this cannot be properly used when weighing book against book only—often good against bad authority. Mr. Watson justly observes that we should look to the competent local botanist for the particulars of the nature of the locality, and too much care cannot be exercised in this kind of observations. It should also be remembered that the general "area" of a species is always somewhat vaguely known: hence the danger of trusting to general works too implicitly. A disputed point might more safely be referred to the testimony of local floras.

Sufficient attention has hardly yet been paid in England to a strict and exact definition of the kind of localities affected by the different plants (p. 94); yet this is a point of the utmost importance towards distinguishing between natives and introduced plants.

The opinions of different British botanists are contrasted by a comparison between Watson, Babington, and Henslow, for Great Britain; and between Henslow, Baker, and Gordon, for their respective districts of Cambridge, York, and Moray. These tables (p. 110) possess unusual interest; and we trust they will be carefully studied by those who are engaged upon any local flora.

Chapter IV. is devoted to a general account of the physical geography and climate of Great Britain; but, though indispensable to the right understanding of the future chapters, we do not think any portion of it will require quotation: it must be read as a whole.

With Chapter V. begins the first table of distribution, of which we reproduce a line, to show how much is here condensed:—

<i>Anemone</i> }	Long.	Lat.	Alt.	Zones.	Con. Type.
<i>nemorosa</i> }	i.w.e.	s.m.n.	c.a.u.	1, 2, 3, 4, 5.	85. B,

which will be easily read as "Found in Ireland, in the west and east; in the southern, midland, and northern districts of Great Britain; at

coast level, 'ascending' and 'upper' stages of elevation; in five out of the six climatal zones,—*i.e.* in all except the highest. Occurs in 85 of the 112 vice-counties* or subdivisions; belongs to the British type of distribution, or the group universally spread throughout Great Britain." What must have been the amount of labour in the field no less than in the study requisite for the compilation of these fifty pages! Feeling the difficulty in many cases of assigning a plant precisely to any one of his "types," Mr. Watson has here made use of a second small letter, which indicates the other type to which the distribution of the species most nearly approaches after that indicated by the capital letter.

In Chapter VI. the species are arranged differently. Instead of following each other in systematic order, they are placed according to frequency, beginning with the most common, *Ranunculus Flammula*, down to *Epipogium aphyllum*, only less rare upon the Continent than in Britain, where a few roots alone have hitherto been discovered; and this is no critical species, or likely to be mistaken for any other plant.

The lines in this chapter run thus:—

Co.	26 Subprovinces.	S.	N.	W.	Sc.	E.	Bentham.
43.	<i>Sagina maritima</i> .	11.	15.	9.	11.	6.	<i>procumbens</i> .

(Occurs in 43 of the 112 counties and vice-counties; in 26 out of the 38 sub-provinces; in 11 of the 19 sub-provinces of South Britain; in 15 of the 19 sub-provinces of North Britain; in 9 of the 12 sub-provinces of the West of England, in 11 of the 13 Scotch, and in 6 of the 13 comprised in the East half of England. Joined to *S. procumbens*, as a variety only, in Mr. Bentham's 'Handbook.')

For comparison between local floras, we imagine this list should be thus used:—After carefully checking off every species, we should reckon up how many out of each 1st, 2nd, 3rd, &c., hundred are present in our district, and how many absent. Thus the absence of 20 species out of the most common hundred might be a more remarkable feature than the presence of 30 of the species between 800 and 900.

In Chapter VII. ("the areas of species") the plants are set in order of latitude from south to north, commencing with such as are restricted to Province 1 (Scilly, Land's-end, &c.). There are three subdivisions, into—1. Australs (or plants thinning out northwards); 2. General or ubiquitous species; 3. Boreal and montane. A line here is—

Sect. 5. Southward of 55° Lat. Temp. 48° Fahr. 8°·8 Centigrade.

Vicia bithynica. 1. 2. 3. * 5. 6. 7. * * 10.

From this list are to be deduced the characteristics of each county

* It will be easily understood that, by the use of this increased number of districts, far greater accuracy is attained than if eighteen Provinces only had been employed, as in the earlier volumes of the 'Cybele.' Still it is believed that the data to be obtained are not as yet sufficient to warrant the use of any more than eighteen districts for the other branches of our fauna and flora.

flora, as in the former, by reckoning up how many are absent, how many present, out of each hundred or section.

Chapter VIII. is devoted to a detailed account of the altitudes reached by the several species: first upon the Grampians; secondly, upon the mountains of the North of England (Lakes and Yorkshire). A few of the upper limits attained in other less explored districts are added, as a kind of supplement to or check upon the two former lists. The upper and lower limits of the plants are both given, and the names succeed each other in a descending series. The desirableness of a careful survey of the heights attained in Wales is very justly insisted upon; and we must urge that duty as no unworthy undertaking for a strong-limbed and energetic botanist who would do his science some service, and turn his knowledge of species to account.

In Chapter IX. the Orders are contrasted,—first, according to their prevalence among British plants in Europe, and in the world; secondly, as they occur in the west and east, in the south, middle, and north of Britain; and thirdly, according to their proportion in the three stages or zones of elevation.

In Chapter X. the author gives us the general results or recapitulation of his labours. It is in accordance with Mr. Watson's dislike of general remarks, that he is himself especially diffident and cautious in suggesting conclusions. If it may be said, with some truth, that the fourth volume of the 'Cybele' does not offer many new solutions of the grand problems of geographical botany, it should be remembered that such was not the professed object of its author. But, as regards the distinctive features of the flora of Britain, there is in the concluding chapter a mass of most interesting information, of which, however, space will not here permit a sufficiently extended notice. We must reserve the analysis and discussion of this part of the subject for a future occasion.

The Isle of Wight

PROCEEDINGS OF LEARNED SOCIETIES.

ZOOLOGICAL SOCIETY.

January 11, 1860.—Dr. Gray, F.R.S., V.P., in the Chair.

DESCRIPTION OF A NEW SPECIES OF CUSCUS (*C. ORNATUS*)
FROM THE ISLAND OF BATCHIAN. By DR. JOHN EDWARD
GRAY, F.R.S., V.P.Z.S., PRES. ENT. SOC., ETC.

Mr. Wallace has sent to the British Museum a series of Mammalia collected in the Island of Batchian in the year 1859.

The most interesting specimen is a new species of the genus *Cuscus*, belonging to the section of the genus which has the inner surface of the ears bald. It may be thus described:—

CUSCUS ORNATUS.

Male pale golden-brown; back rather darker, with small irregular white spots; crown and back with a narrow longitudinal blackish